

Montana Weather/Precipitation Summary

March 2014 by NOAA's National Weather Service Great Falls Montana

Temperatures averaged below normal across most of the state in March. A ridge of high pressure just off the west coast of North America brought sustained northwest flow to Montana, while a trough of low pressure over central North America was stronger than normal (Figure 1). This trough brought cold air to the state for most of the month.

Statewide composite temperatures averaged 2.8°F below normal for the month. This was the coolest March since 2011. Figure 2 shows the areas of temperature anomalies. The greatest negative anomaly was around Cut Bank, where temperatures were more than 6.2°F below normal. The greatest positive departure was in the Holter Dam area. The warmest average March temperature was 39.8°F at Superior, and the coolest was 20.9°F at Westby. For the past 12-months, the statewide composite average temperature is 0.8°F below normal. Five of the past 12 months have had temperature averages below normal.

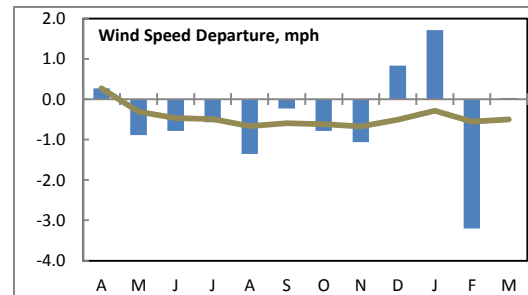
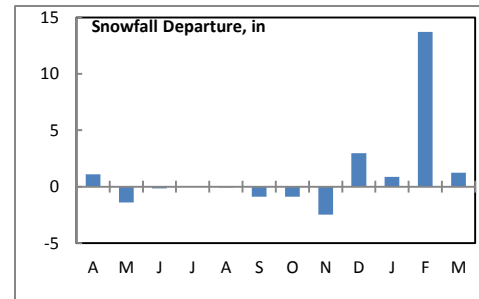
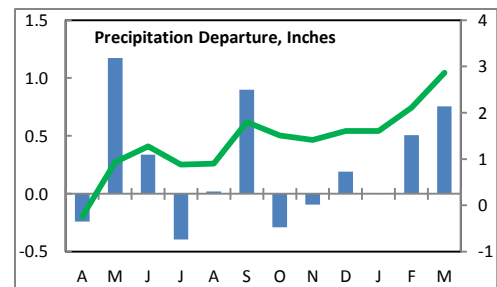
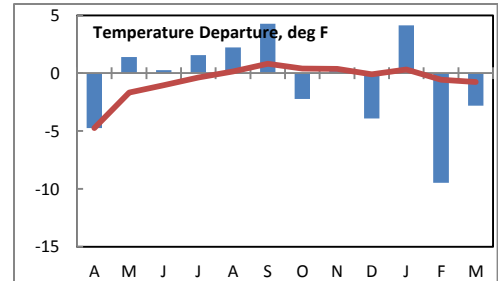
The monthly departure from normal for precipitation across Montana is shown in Figure 3. This figure shows that above normal precipitation was common across much of the western 2/3 of the state, with pockets of below normal values over the northeast and southwest. The heaviest precipitation fell along the western border. Values of nine to over 18 inches were reported over higher elevations in the west. The precipitation figure to the right shows that this month had a 0.76-inch positive departure. The statewide composite precipitation for the past 12 months is 2.8-inches above normal. After the wettest February since 1986, this was the wettest March since 1982, and the second wettest March of record. Bozeman MSU had their wettest March of record. While some portions of the state continue to see precipitation deficits, the statewide average for the first three months is the greatest since 1982.

Snowfall was generally above average statewide. Again, there were pockets with below normal values, but overall, the statewide average was 11.2 inches, or 1.3 inches above normal. This is now the snowiest water-year since 2010, and the snowiest year (Jan-Mar) since 1989.

On a statewide average, winds were normal this month. Below normal values were restricted to portions of central Montana. The statewide composite average was 9.6 mph, with the 12-month average running 0.5 mph below average. The fastest average speed was 19.6 mph at Logan Pass, with Livingston registering 18.2 mph. The fastest measured gust of the month, 93 mph, occurred near Whitlash, in the Sweet Grass Hills

Refer to NCDC's State of the Climate report for the latest monthly discussion:
<http://www.ncdc.noaa.gov/sotc/>.

After a cold start, with temperatures dropping well below zero, temperatures warmed to near normal by the fourth. The low of -36°F at Ridgeway on March second was the coldest March



temperature in the state since 2003. Normal to above normal temperatures prevailed through the 19th. After this, temperatures were below normal most areas through the rest of the month. Warm air briefly pushed into southeast Montana on the 29th, when temperatures pushed to 70F at Broadus. Precipitation came at regular intervals throughout the month. Heavy snow across southwest Montana brought precipitation values to near normal, after drier conditions over the preceding two months. Heavy precipitation also fell across western Montana, especially higher elevations. Flattop Mountain recorded 18.3 inches of precipitation. This was the highest March value in the state since 1997. Several locations recorded nearly ten or more inches of precipitation. Many Glacier tied their March record, recording 9.90 inches of precipitation. There were a couple of windy periods during March. Generally, the warmer period from the 8th through 20th was windy. The highest gusts at most locations were reached during this period. Winds briefly returned on the 29th, when a brief warm-up came to the state.

Precipitation/convection

Severe convective weather occurred on no days in March. This is normal for the month.

March summary information:

High Temperature	70°F at Broadus (29 th)	Greatest Precip	9.51" at Mullan Pass
Low Temperature	-36°F at Ridgeway (2 nd)		18.30" at Flattop Mountain SNOTEL
Warmest Ave Temp	39.8°F at Superior	Peak Wind Gust	93 mph near Whitlash (Liberty) (9 th)
Coolest Ave Temp	20.9°F at Westby		92 mph at Logan Pass (8 th)
Range of Temp departures	-6.2°F at Cut Bank to 1.1°F at Holter Dam	Highest Ave Wind	19.6 mph at Logan Pass 18.2 mph at Livingston
21 city mean monthly Temperature/Normal	30.4/33.2F 2.8F below normal. 58 th coldest of record (since 1880). 42 nd percentile. Oct-Mar 26.4/28.8 2.4F below normal. 34 th coolest of record.	20 city mean monthly wind speed/Normal	9.6 mph/9.6 mph; 34 th calmest of record (since 1936). 43 rd percentile. Oct-Mar 9.4mph/9.8 0.4-mph below normal. 31 st calmest of record.
22 city mean monthly precipitation/Normal	1.75/0.99" – 176% of normal. 2 nd wettest of record (since 1880). 96 th percentile Oct-Mar 6.19"/5.11" 1.08" above normal. 24 th wettest of record.	20 city mean monthly snowfall and normal	11.2/9.9" – 2.3" above normal. 38 th highest. 70 th percentile. Oct-Mar 66.9"/51.4" 15.5" above normal. 10 th highest.

Historical Rank of Precipitation (inches) for the Current Month and Water Year to Date

Location	Mar	% of Norm	Rank	Pcntl	Oct 1 – Mar 31	% of norm	Rank	Pcntl	Years
Baker	0.67	108%			3.59	116%			16
Billings	1.32	118%	86	75	9.29	179%	113	100	113
Belgrade	1.49	159%	69	88	3.49	82%	24	30	77
Butte	1.25	164%	102	85	3.15	89%	47	39	120
Cut Bank	0.50	100%	67	62	2.59	136%	72	67	107
Dillon	0.34	63%	27	35	1.06	45%	3	3	74
Glasgow	0.71	169%	88	75	2.51	97%	48	41	115
Great Falls	1.31	144%	98	80	5.78	149%	105	86	122
Havre	1.14	211%	126	93	3.81	149%	93	69	134
Helena	0.80	136%	86	63	4.33	154%	98	72	136
Jordan	0.66	127%			3.68	143%			16
Kalispell	2.44	224%	117	97	9.33	126%	101	84	120
Lewistown	1.47	148%	96	81	4.83	107%	58	49	118
Livingston	1.98	236%	110	97	5.37	128%	83	75	111
Miles City	1.31	218%	120	88	3.24	118%	68	49	137
Missoula	1.77	184%	127	93	6.82	124%	96	71	134
Mullan Pass	9.51	213%	70	99	33.08	129%	61	83	73
Wolf Point	0.24	52%			0.94	38%			16
Glendive	0.99	165%	100	85	3.84	121%	82	71	115
Sidney	0.61	102%	47	62	3.11	89%	38	51	73
BZN-MSU	3.45	250%	136	100	8.71	128%	119	88	135

Rankings and Percentiles are 1=driest, higher numbers=wetter.

For an automated version of this chart, updated daily, go to

<http://www.wrh.noaa.gov/tfx/dx.php?wfo=tfx&type=&loc=products&fx=PCPNTOTALS>

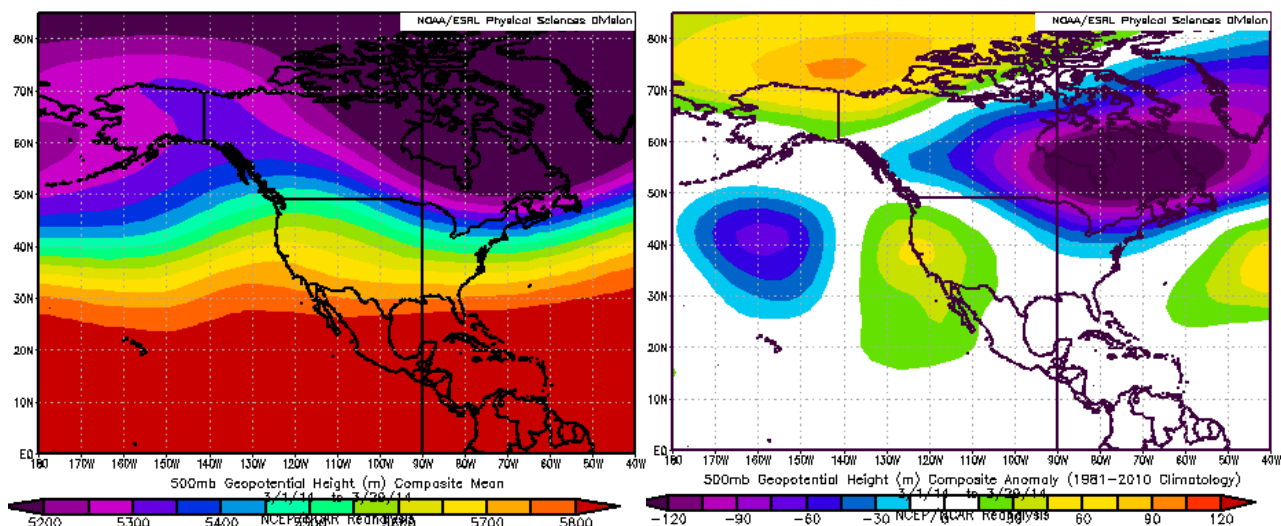


Figure 1. Mean flow at 500 millibars (~18,000 ft) for this month (left) and departure from normal (right). The trough over North America was stronger than normal.

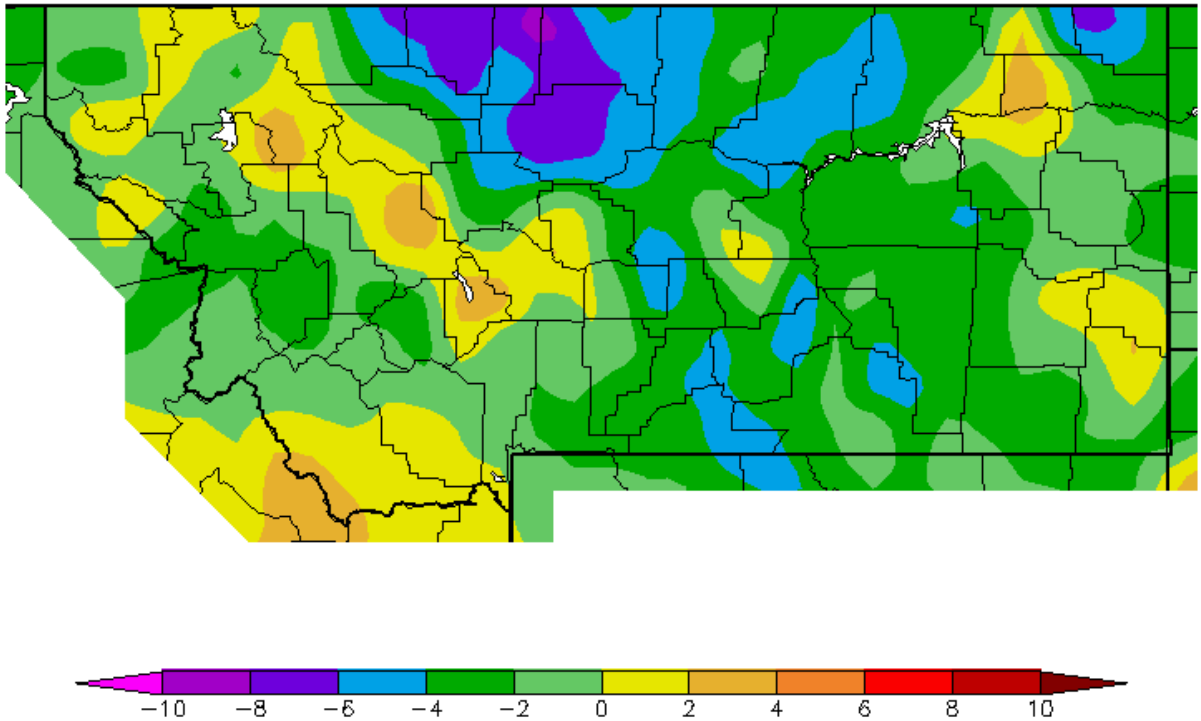


Figure 2. March 2014 temperature departures from normal (°F) (Western Region Climate Center).

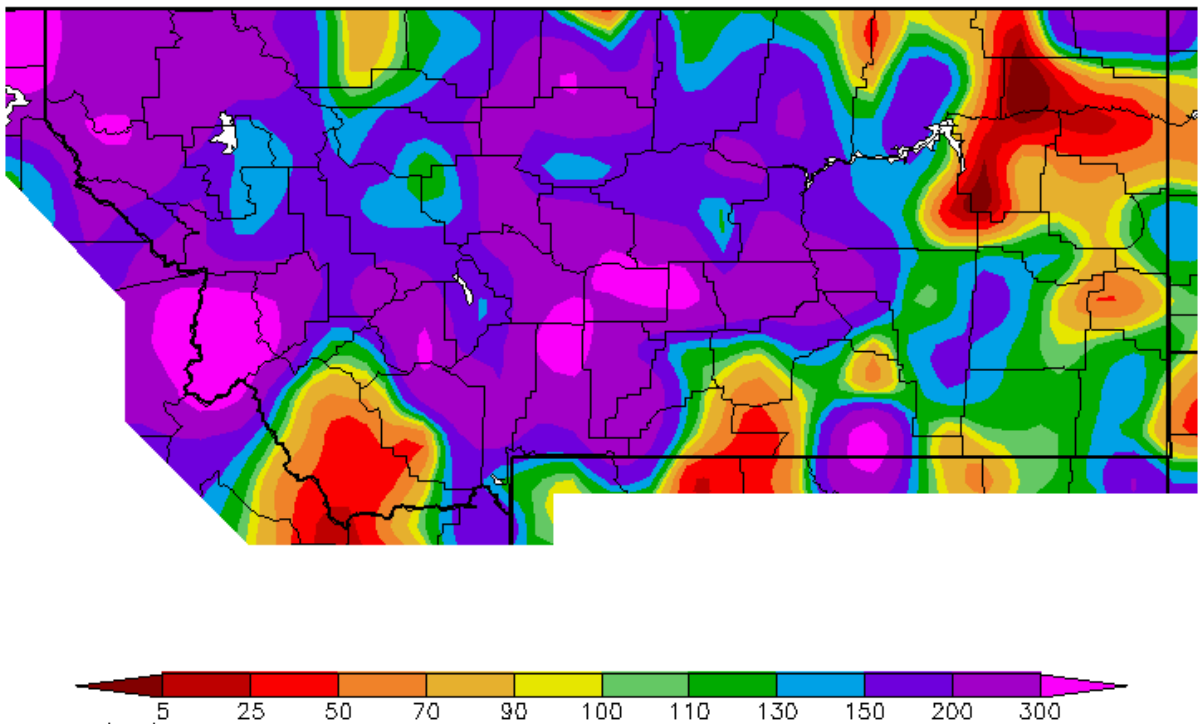


Figure 3. March 2014 precipitation departures from normal (percent) (Western Region Climate Center).

For a state map of % of normal water year precipitation (updated around the 7th of each month), go to:
http://www.wrhc.noaa.gov/tfx/image.php?wfo=tx&type=data&loc=hydro&fx=watyr_pcnorm.png

For the latest information on mountain snow pack from the NRCS, go to:
<http://www.mt.nrcs.usda.gov/snow/index.html>

For the latest U.S. Drought Monitor, issued weekly by the Climate Prediction Center (CPC), go to:
<http://www.drought.unl.edu/dm/monitor.html>

These data are preliminary and have not undergone final QC by NCDC. Therefore, these data are subject to revision. Final and certified climate data can be access at the National Climatic Data Center (NCDC) <http://www.ncdc.noaa.gov>. Many more links are on the Drought Information Page of the NWS Great Falls web site at <http://www.wrh.noaa.gov/tfx/main/drought.php?wfo=tfx>. The climatological record for normals is 1981-2010. The ranking period for temperature, precipitation and snowfall is since 1880. The ranking period for wind speeds is since 1936. The ranking period for soil moisture is since 1995.